Modoc Budworm
1985 Egg Mass and Defoliation Survey
on the Winema and Fremont
National Forests and Adjacent Lands

By

Iral Ragenovich, Entomologist
USDA Forest Service
Pacific Northwest Region
Portland, OR

Introduction

An egg mass density and defoliation survey of the Modoc budworm, Choristoneura retiniana, was conducted on the Fremont and Winema National Forests in September 1985. The purpose of the evaluation was to determine the potential population density and subsequent defoliation on these Forests and adjacent lands for 1986.

The current infestation is the fourth on record since the 1940's. Previous infestations have collapsed within 4 to 5 years, apparently from natural factors. Damage to the trees has been limited to growth loss and scattered top-kill in infested stands.

Technical Information

Insect - Modoc budworm, Choristoneura retiniana (Walsingham).

Hosts - Primarily white fir, Abies concolor, and Douglas-fir, Pseudotsuga menziesii.

Range of Insect - The Modoc budworm occurs primarily in northern California and southern Oregon. It is occasionally found within other parts of the range of western spruce budworm, Choristoneura occidentalis Freeman.

Location and Extent of the Infestation

The current infestation of Modoc budworm was first detected in 1982. Initially, the infestation was located on the Lakeview Ranger District on the Fremont NF and the Chiloquin Ranger District on the Winema NF. By 1984, the infestation had spread to include portions of the host type on all Ranger Districts of both Forests and some of the adjoining lands. During the 1985 annual aerial detection survey, a total of 385,930 acres of visible defoliation were mapped in on the Fremont NF and adjoining lands, and 117,470 acres on the Winema NF and adjoining lands, for a total of over half a million acres of defoliation. Figure 1 shows the general location of the Modoc budworm infestation in south-central Oregon. Figures 2 and 3 show the location of the infestation on the Fremont and Winema NF's and adjacent lands, respectively.

Methods and Materials

Egg mass sampling was done within or near the areas of defoliation detected on the 1985 aerial detection survey. Samples were taken both in areas where defoliation had occurred for several years and areas where visible defoliation had been detected for the first time. A total of 38 plots were established on the Fremont NF and 17 on the Winema NF.

At each egg mass plot, one 45-cm branch tip was removed from each of five sample trees. Branch tips were sampled from the mid crowns of trees 7 to 14 meters tall using polepruners equipped with catch baskets. Sample trees could be either Douglas-fir or true fir, but all five sample trees had to be the same species.

Branches were taken to the laboratory where they were rated for the extent of defoliation on new growth. Twenty buds were rated for defoliation using the 6-class defoliation index system. Then overall estimates of average defoliation were made for the defoliation damage incurred in 1984 and 1983. The 6-class index key is as follows:

Index	% Defoliation	Index	% Defoliation
1 =	0	4 =	51 - 75
2 =	1-25	5 =	76 - 99
3 =	26-50	6 =	100

The needles on the branches were then examined for egg masses. Needles with egg masses were separated as new (current year's) or old (previous year's) and the number recorded.

The MUST Program[1/], which computes the mean and standard deviation from a multistage sample design, was used to analyze the data.

Results and Discussion

Tables 1 and 2 list the numbers of acres of visible defoliation for each Forest and the adjoining lands for 1982 through 1985. Overall, the area of infestation has increased. For most areas, visible defoliation has only been detected for 2 years. The Lakeview RD on the Fremont NF, the Chiloquin RD on the Winema NF, and some of the adjoining lands have sustained 3 or more years of defoliation. While overall, the numbers of acres of defoliation have increased, on some areas the numbers of acres of visible defoliation have decreased. For example, defoliation has been recorded for the Lakeview and Chiloquin RD's for 4 years. Defoliation decreased from 154,090 acres in 1984 to 143,730 acres in 1985 on the Lakeview RD, and from 68,730 acres in 1984 to 63,020 acres in 1985 on the Chiloquin RD. Defoliation also decreased from 7,060 acres in 1984 to 1,730 acres in 1985 on Crater Lake National Park.

1/ Hazard, John and Larry E. Stewart. 1979. Planning and processing multistage samples with a computer program--MUST. USDA Forest Service, PNW Sta. Gen Tech. Rpt. PNW-11. 15 p.

The following are the results of the egg mass and defoliation survey:

Sample Area	Egg Mass Density New Egg Masses/M2	Ratio Old:New	Avg. Defoliation Index 1983	1984	1985
Fremont NF	1.49 ± .37	1:3.7	2.4	3.3	5.2
Winema NF	2.08 ± .48	1:2.8	3.1	3.4	4.9

Based on the results of the egg mass sample and the ratio of old to new egg masses, overall population densities will remain at about the same level as 1985. However, population levels in individual areas within the overall infested area may increase or decrease significantly.

The average overall defoliation estimates on the current year's growth has increased over the past 3 years. On the Fremont NF, there was an average index of 2.4 (or about 12 percent) defoliation in 1983 which increased to an index of 5.2 (or about 81 percent) defoliation in 1985. On the Winema NF, defoliation increased from an index of 3.1 (or about 30 percent) in 1983 to an index of 4.9 (or about 70 percent) in 1985.

Conclusions and Recommendations

Although the area of visible defoliation has continued to expand, most of the infested area has had only 2 years of defoliation. Parts of the Lakeview RD and the Chiloquin RD have sustained defoliation for 4 years. Some growth loss may result in trees in localized areas; however, based on the previous history of the insect, severe damage is not expected to occur.

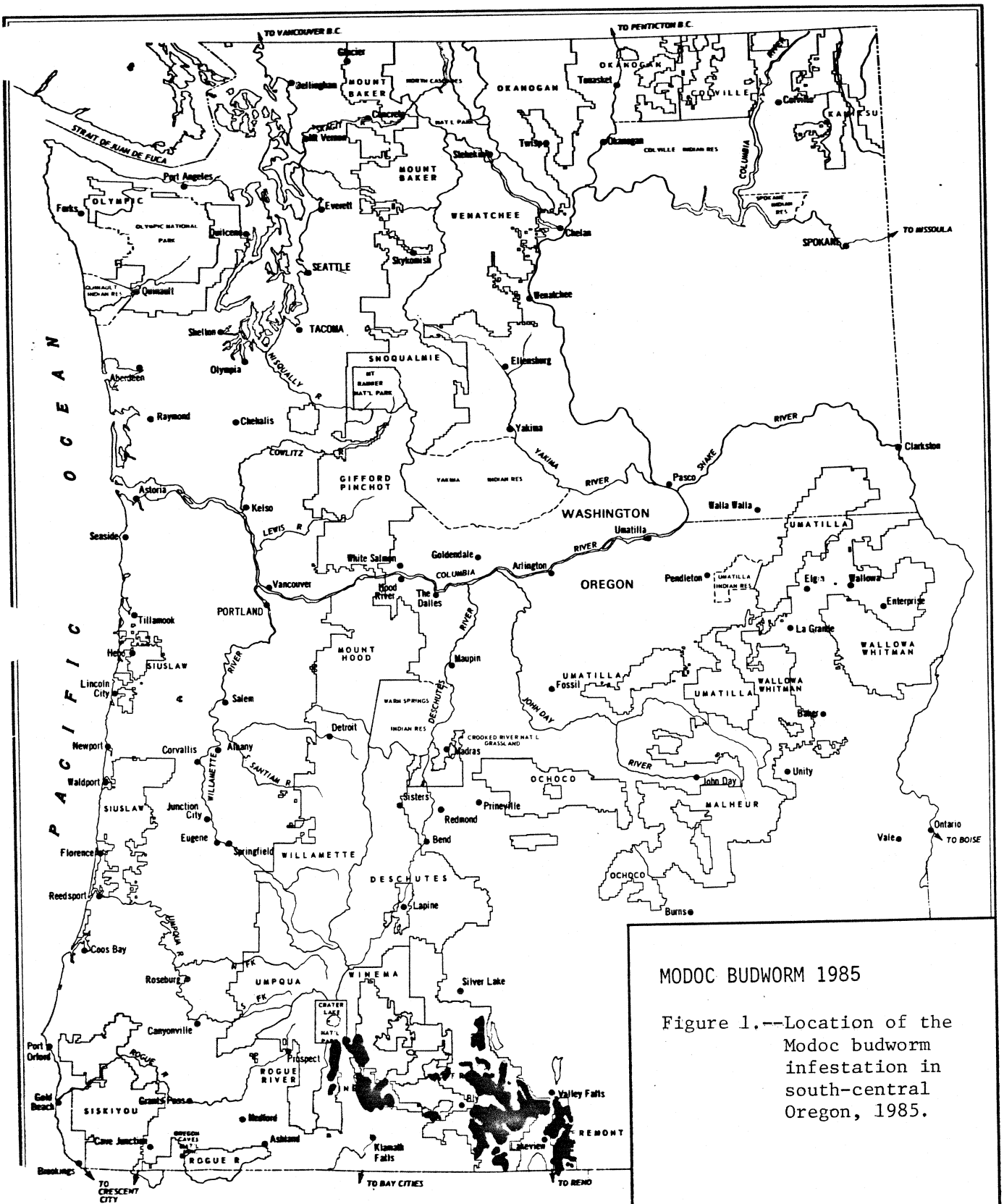
No action is recommended at this time. However, Forest Pest Management personnel will continue to monitor the infestation.

Table 1.--Extent of visible Modoc budworm defoliation on the Fremont National Forest and adjacent lands, 1982 - 1985.

Reporting Area	Acres			
	1982	1983	1984	1985
Fremont NF				
Bly RD			81,320	76,510
Lakeview RD	1,240	60,280	154,090	143,730
Paisley RD			15,350	64,710
Silver Lake RD			3,240	6,300
Gearhart Mountain Wilderness Area				6,760
Subtotal	1,240	60,280	254,000	298,010
BLM Lands		230	3,000	1,770
State & Private Lands	520	20,840	75,200	86,150
Total	1,760	81,350	332,200	385,930

Table 2.--Extent of visible Modoc budworm defoliation on the Winema National Forest and adjacent lands, 1982 - 1985.

Reporting Area	Acres			
	1982	1983	1984	1985
Winema NF				
Chemult RD			11,420	8,270
Chiloquin RD	3,190	41,850	68,730	63,020
Kalamath RD			19,600	22,480
Subtotal	3,190	41,850	99,750	100,770
Crater Lake National Park			7,060	1,730
BLM Lands			150	
State & Private Lands		3,410	11,640	14,970
Total	3,190	45,260	118,600	117,470



MODOC BUDWORM 1985

Figure 1.--Location of the Modoc budworm infestation in south-central Oregon, 1985.

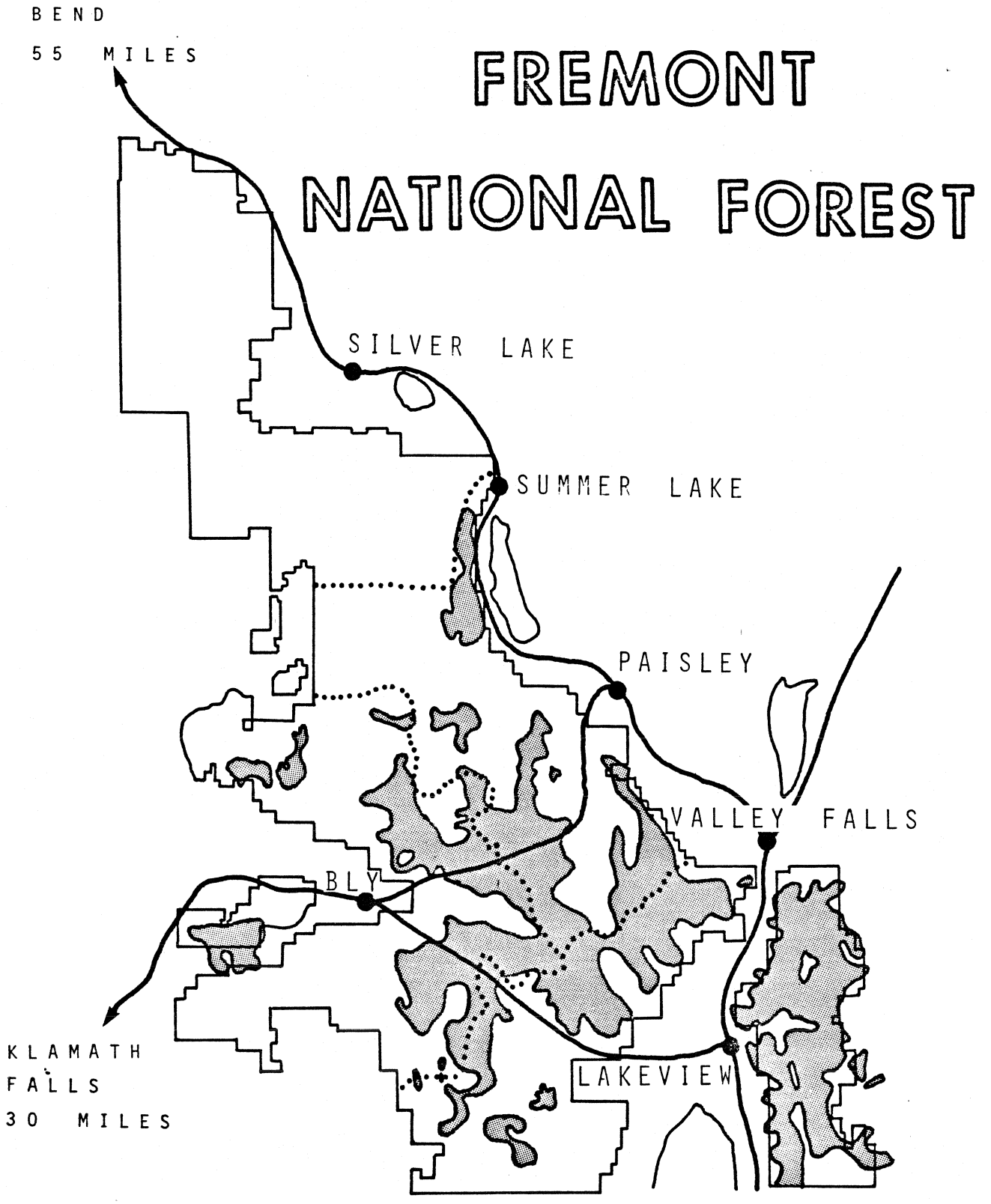


Figure 2.--Location of the Modoc budworm infestation on the Fremont National Forest and adjacent lands, 1985.

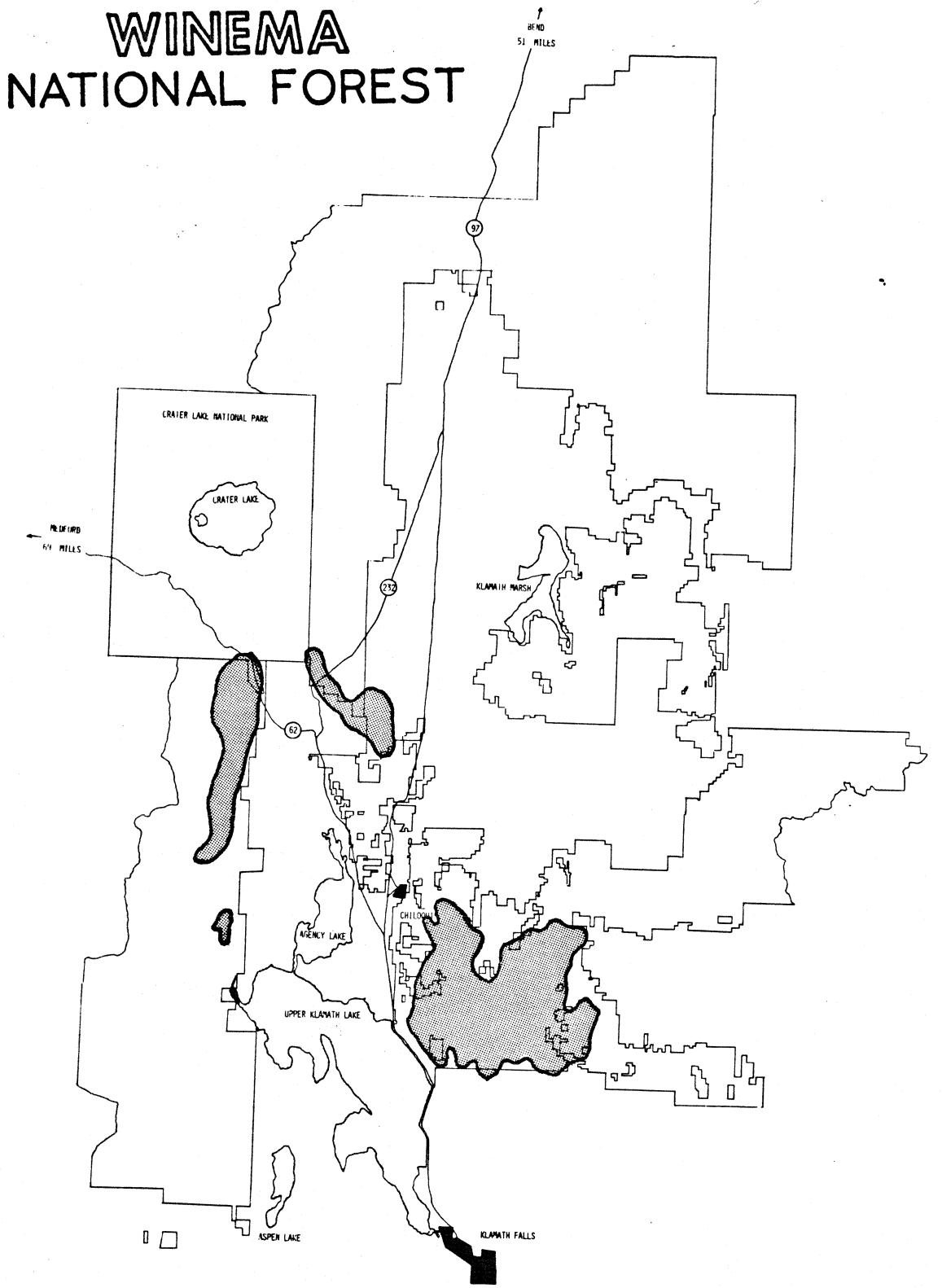


Figure 3.--Location of the Modoc budworm infestation on the Winema National Forest and adjacent lands, 1985.